CLAIMS

1. A method of hydrogenating a phenol using carbon dioxide, the method characterized by reacting a phenol and hydrogen together in the presence of a supported rhodium and/or ruthenium catalyst using carbon dioxide so as to hydrogenate the phenol.

2. The method of hydrogenating a phenol according to claim 1, characterized in that the hydrogenation is carried out at a reaction temperature of 20 to 250°C.

3. The method of hydrogenating a phenol according to claim 1 or 2, characterized in that the hydrogenation is carried out at a reaction pressure of 0.2 to 100 MPa.

4. The method of hydrogenating a phenol according to any of claims 1 through 3, characterized in that at least one type of supported catalyst selected from an activated charcoal-supported rhodium catalyst, an alumina-supported rhodium catalyst and an activated charcoal-supported ruthenium catalyst is used as the catalyst.

5. The method of hydrogenating a phenol according to any of claims 1 through 4, characterized in that carbon dioxide having a temperature of 20 to 250°C and a pressure of 0.1 to 50 MPa is used as the carbon dioxide.

6. The method of hydrogenating a phenol according to any of claims 1 through 5, characterized in that hydrogen under conditions of a temperature of 20 to 250°C and a pressure of 0.1 to 50 MPa is used.

7. The method of hydrogenating a phenol according to any

of claims 1 through 6, characterized in that supercritical carbon dioxide is used as the carbon dioxide.

8. The method of hydrogenating a phenol according to any of claims 1 through 7, characterized in that the hydrogen pressure and the carbon dioxide pressure are adjusted in the presence of the phenol so as to control the conversion ratio of the phenol and/or the selectivities for the phenol hydrogenation products.

9. The method of hydrogenating a phenol according to any of claims 1 through 8, characterized in that the hydrogen pressure and the carbon dioxide pressure are adjusted in the absence of the phenol so as to hydrogenate a cyclohexanone derivative and control the selectivities for the phenol hydrogenation products.

10. The method of hydrogenating a phenol according to any of claims 1 through 9, characterized in that after the conversion ratio of the phenol has reached 100%, the hydrogen pressure and the carbon dioxide pressure are adjusted so as to control the selectivities for the phenol hydrogenation products.

11. The method of hydrogenating a phenol according to any of claims 1 through 10, characterized in that phenol or cresol is used as the phenol.

12. The method of hydrogenating a phenol according to claim 11, characterized in that cresol comprising at least one of meta-cresol, ortho-cresol and para-cresol is used as the cresol.

13. The method of hydrogenating a phenol according to any of claims 1 through 10, characterized in that naphthol is used as the phenol.

14. The method of hydrogenating a phenol according to any of claims 1 through 13, characterized in that each of the phenol hydrogenation products is a cyclohexanone derivative or a cyclohexanol derivative.

15. The method of hydrogenating a phenol according to claim 14, characterized in that the cyclohexanone derivative is cyclohexanone, meta-methylcyclohexanone, ortho-methylcyclohexanone, para-methylcyclohexanone or tetralone, and the cyclohexanol derivative is cyclohexanol, meta-methylcyclohexanol, ortho-methylcyclohexanol, para-methylcyclohexanol, 1,2,3,4-tetrahydronaphthol, 5,6,7,8-tetrahydronaphthol or decahydronaphthol.

16. A method of hydrogenating a cyclohexanone derivative using carbon dioxide, the method characterized by reacting a cyclohexanone derivative and hydrogen together in the presence of a supported rhodium and/or ruthenium catalyst using carbon dioxide at a reaction temperature of 20 to 250°C and a reaction pressure of 0.2 to 100 MPa so as to hydrogenate the cyclohexanone derivative.

17. The method of hydrogenating a cyclohexanone derivative according to claim 16, characterized in that the hydrogen pressure and the carbon dioxide pressure are adjusted in the absence of a phenol so as to control the selectivity for a cyclohexanol derivative.

18. The method of hydrogenating a cyclohexanone derivative according to claim 16 or 17, characterized in that the cyclohexanone derivative is cyclohexanone, meta-methylcyclohexanone,

ortho-methylcyclohexanone, para-methylcyclohexanone or tetralone, and the cyclohexanol derivative is cyclohexanol, meta-methylcyclohexanol, ortho-methylcyclohexanol, para-methylcyclohexanol, 1,2,3,4-tetrahydronaphthol, 5,6,7,8-tetrahydronaphthol or decahydronaphthol.